

What Is Claimed Is:

1. A monitoring system to detect and record an image at a monitored position, the system comprising:

an image-capturing photographing unit adapted to capture at least one photographic image and communicate said image as an image video signal;

a candidate area detection and decision unit adapted to evaluate said image video signal to detect a human skin color candidate area within said image and if detected, to direct said image-capturing photographing unit to capture at least one enlarged photographic image of said human skin color candidate area and output said enlarged photographic image as an enlarged image video signal;

a face detection unit adapted to evaluate said enlarged image video signal to detect a face video signal within said enlarged image video signal; and

a storage and retrieval unit to receive and store said detected face video signal.

2. A monitoring system to detect and record an image at a monitored position as claimed in claim 1, wherein said candidate area detection and decision unit further comprising:

a color difference signal calculation unit adapted to compare a color difference signal level of said video signal with a reference range and to digitize said video signal as a first or second value based upon said comparison; and

a skin color candidate area detection unit adapted to compare at least one of said first and second values with a threshold value detect a skin color candidate area.

3. A monitoring system to detect and record an image at a monitored position as claimed in claim 2, wherein:

said first value indicates a color difference signal level of said video signal within said reference range; and

said second value indicates a color difference signal level of said video signal outside said reference range.

4. A monitoring system to detect and record an image at a monitored position as claimed in claim 2, wherein said candidate area detection and decision unit further comprises:

a decision unit adapted to normalize said skin color candidate area and to determine if said normalized skin color candidate area is a human skin color candidate area.

5. A monitoring system to detect and record an image at a monitored position as claimed in claim 1, wherein said face detection unit further comprises:

a first face candidate area detection unit adapted to use a pattern with said enlarged image video signal to detect a face candidate area;

a second face candidate area detection unit adapted to use a low-resolution support vector machine to detect a specific candidate area within said detected face candidate area; and

a final face detection unit adapted to use a high-resolution support vector machine to detect a face video signal within said specific candidate area.

6. A monitoring system to detect and record an image at a monitored position as claimed in claim 5, wherein:

said first face candidate area detection unit uses an M-Grid Gabor Wavelet pattern with said enlarged image video signal to detect said face candidate area.

7. A monitoring system to detect and record an image at a monitored position as claimed in claim 5, wherein:

said second face candidate area detection unit uses a Principal Component Analysis to generate a plurality of face and non-face feature vectors for use with said support vector machine.

8. A monitoring system to detect and record an image at a monitored position as claimed in claim 1, wherein said storage and retrieval unit further comprises:

a compression/decompression unit to compress or decompress at least one of said image video signal, enlarged image video signal and detected face video signal;

a data base generation unit to create a data base based upon at least one of said image video signal, enlarged image video signal and detected face video signal;

a recording unit to store at least one of said image video signal, enlarged image video signal and detected face video signal; and

a monitor to display at least one of said image video signal, enlarged image video signal and detected face video signal.

9. A monitoring system for detecting and recording an image at a monitored position as claimed in claim 1, wherein said storage and retrieval unit further comprises:

a key manipulation unit to direct said capturing, storage and retrieval of at least one of said image video signal, enlarged image video signal and detected face video signal.

10. A monitoring system to detect and record an image at a monitored position as claimed in claim 1, wherein:

said photographing unit further comprises a pan, tilt and zoom mechanism for capturing said photographic image and said enlarged photographic image.

11. A monitoring system to detect and record an image at a monitored position as claimed in claim 1, further comprising a switching unit adapted to selectively switch one among said candidate area detection and decision unit and said face detection unit to provide said image video signal.

12. A monitoring system to detect and record an image at a monitored position as claimed in claim 2, further comprising a filter adapted to filter noise from said digitized video signal.

13. A monitoring system for analysis, storage and retrieval of an image, the system comprising:

an image photographing unit adapted to capture at least one of a normal and an enlarged video signal of an image;

a candidate detection unit adapted to evaluate said captured normal video signal to detect a human skin candidate area based upon a color range and control said image photographing unit to capture an enlarged video signal of said human skin candidate area;

a face detection unit adapted to evaluate said captured enlarged video signal of said human skin candidate area to detect a facial image video signal; and

a storage and retrieval unit adapted to store said facial image video signal.

14. A monitoring system for analysis, storage and retrieval of an image as claimed in claim 13, further comprising:

a data base of said facial image video signals adapted to allow a user to search for a desired normal, enlarged and facial image video signal from a large amount of recorded video signals.

15. A method to detect and record an image at a monitored position, the method comprising the steps of:

converting an analog image video signal taken at a predetermined magnification factor through an image capturing unit into a digital image video signal and evaluating said digital image video signal to determine if a human skin color candidate area is detected, and if said candidate area is detected, controlling said image capturing unit to capture an enlarged analog image video signal of said human skin color candidate area; and

converting said enlarged analog image video signal into an enlarged digital image video signal and evaluating said enlarged digital signal to determine if a face image video signal is detected, and if said face image video signal is detected, recording said face image video signal.

16. A method to detect and record an image at a monitored position as claimed in claim 15, further comprising the step of:

comparing a color difference signal level of said digital image video signal with a color reference range to determine if said human skin color candidate area is detected; and

applying at least one of a pattern, low-resolution support vector machine and a high-resolution support vector machine to detect said face image video signal.

17. A method to detect and record an image at a monitored position as claimed in claim 15, wherein said recording said face image video signal further comprises the steps of:

compressing said face image video signal and generating a face image data base for said signal; and

recording said compressed face image video signal and said data base.